Working with Students to Help Them Understand Fractions

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shares her experiences of teaching fractions.

This article reports on my recent experiences with teaching fractions to a Grade 6/7 class. I was keen to provide the students with engaging activities that would enable them to develop a sound understanding of the concepts taught. I wanted them to be exposed to a range of strategies and to have fun with their learning. Teaching fractions to students has come a long way since I was schooled back in the 1970s and I wanted to use teaching approaches that reflected recommendations made by school mathematics reformers (e.g., Van de Walle, 1999).

As a result of conversations with students, previous teaching experiences and through reading relevant literature, I was aware that many students struggle with understanding fraction concepts. In particular, I knew that students would have difficulty with reading, renaming, ordering, interpreting and applying common fractions (Siemon, 2003), fraction computation (Van de Walle, 2007) and equivalent fractions (Evans, 2005). I also suspected, and there was evidence to suggest, that many of these difficulties could be attributed to a heavy emphasis on procedural knowledge, symbolic rules and manipulation in earlier grades (Evans, 2005).

As part of the numeracy curriculum, I knew I would have to cover fractions at some stage in the year and I was not really sure how to approach it with a much younger class than I had previously taught. According to our

state's curriculum framework, students at this level should:

- understand common fractions in any context;
- read, name, compare and locate common fractions on a number line; and
- identify common fractions (Department of Education, 2007).

My aim therefore, was to review where students were at and to engage them in stimulating activities that were relevant to the curriculum and likely to result in them developing a sound understanding of fraction concepts. I also worked closely with our school's numeracy resource teacher and found this was very beneficial in terms of collaborative planning, modelling of different teaching approaches and access to relevant and purposeful activities.

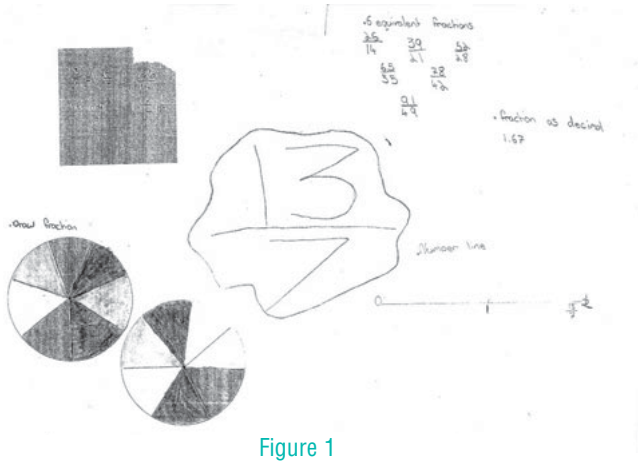

Figure 1

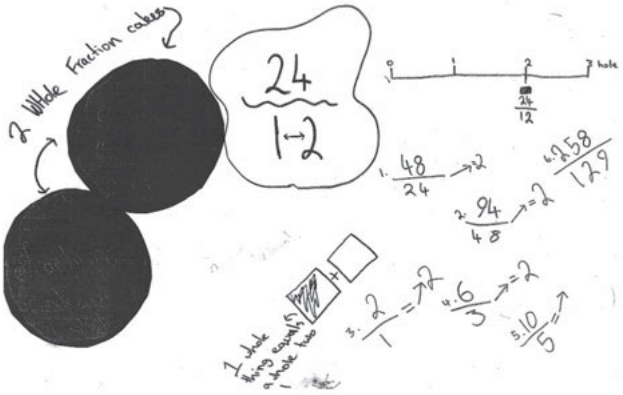

Figure 2

Teaching experiences

I began by returning to the 'basics,' brainstorming what students thought a fraction was, sharing these ideas as a whole class and recording these ideas in their maths books. Following this, we engaged in a number of tasks that enabled students to demonstrate their understanding. For example, students recorded all they knew about a favourite fraction using a task sourced from *Mathematics Assessment for Learning: Rich Tasks and Work Samples* (Downton, Knight, Clarke & Lewis, 2006).[1] This particular task required students to list equivalent fractions, draw representations of their fraction and represent their fraction on a number line. Two students' work samples are included in Figures 1 and 2.

General observation and conversation were used as formative assessment during these sessions. Being able to get the students to talk about what they were doing, as well as what they had completed and how they had done it, was vital in order to indicate where to go to next. The 'favourite fraction' activity revealed, for example, that students were primarily using the rule of "multiplying the top and bottom numbers by the same number" in order to generate equivalent fractions. I was keen for them to explore other strategies to generate equivalent fractions and found that two activities in particular provided opportunities for students to both name and describe their strategies for finding equivalent fractions. We made use of a clothes line on a number of occasions to 'pin' different fractions in order of size (see Figure 3). Equivalent fraction examples were also used and students were encouraged to justify their placement of

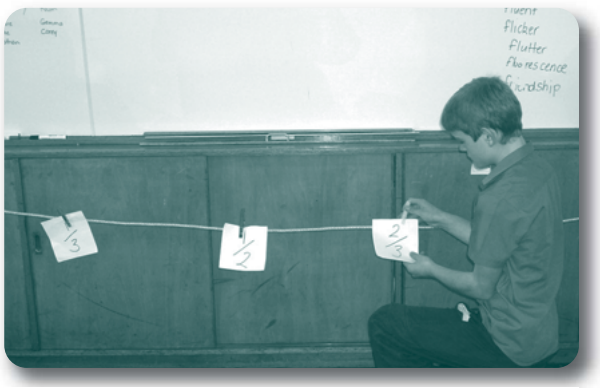

Figure 3

1. See resource review, p. 27.

Figure 4. Follow me cards.

fractions and to state how they knew they were equivalent. Once students were confident with naming equivalent fractions, we used a "follow me" game to practice and consolidate their understanding. This game involves each class member having one card with a fraction and a fraction question written on it (see Figure 4 for examples of cards). Students really enjoyed participating in this activity and the next challenge would be for them to construct their own individual sets of "follow me" cards.

A student's perspective

Before undertaking this learning sequence on fractions, I had been approached by a number of students who admitted that they had struggled with fractions, and wanted to know if they would be learning about fractions this year. One student, Kee, was particularly concerned about her fraction knowledge and it was rewarding to see her confidence and understanding develop as she participated in the activities. I asked her to record some of her thoughts about how she now felt about fractions and whether or not the experiences offered were beneficial to her understanding. She wrote the following:

> At the beginning of the year I was struggling with my fractions and even I could tell. It was a big task for me just to figure out basic fractions.
>
> So Mrs T thought for a while and came up with the idea that with the help of Mrs M [numeracy resource teacher], not just me but the whole class could really improve in their fractions.
>
> We looked at number lines, decimals, improper fractions and my favourite, equivalent fractions.
>
> It was hard for me at first but the more I listened and the more the lessons went on I felt like I was getting the hang of it and it showed in my work too.
>
> To celebrate our improvement our last task was to figure out fractions of groups. At the end of the lessons everyone was happy because we all got chocolates.

Summary

When reflecting on the effectiveness of the learning sequence, I felt satisfied that the experiences offered to students engaged them, helped promote positive attitudes towards mathematics in general, and allowed them to demonstrate their understandings in a variety of ways. I think the 'success' was due to a number of factors, such as focusing on developing conceptual understanding, finding out about the strategies students used and really listening to the students' responses. Often their comments revealed that they too experienced the difficulties that other researchers had noticed and once these difficulties were made explicit, then they could be addressed. Hopefully this article will inspire other teachers to under-

take similar experiences with their students; the resources included in the reference list could be a useful starting point.

References

Department of Education, Tasmania (2007). *The Tasmanian Curriculum: Mathematics–numeracy.* Hobart: Author.

Downton, A., Knight, R., Clarke, D. & Lewis, G. (2006). *Mathematics Assessment for Learning: Rich Tasks and Work Samples.* Melbourne: Mathematics Teaching and Learning Centre.

Evans, R. (2005). Activities to develop fraction concepts. In M. Coupland, J. Anderson & T. Spencer (Eds), *Making Mathematics Vital (Proceedings of the twentieth biennial conference of the Australian Association of Mathematics Teachers,* pp. 292–299). Adelaide: AAMT.

Siemon, D. (2003). Partitioning — The missing link in building fraction knowledge and confidence. *The Australian Mathematics Teacher, 59* (2), 22–24.

Van de Walle, J. (1999). *Reform Mathematics vs. the Basics: Understanding the Conflict and Dealing with It.* Retrieved 20 June 2008 from http://mathematicallysane.com/analysis/reformvsbasics.asp

Van de Walle, J. (2007). *Elementary and Middle School Mathematics* (6th ed.). Boston, MA: Pearson Education Inc.

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